

# Index to Volume 35 (2003)

No 1 (January) pp 1–124 No 2 (February) pp 125–214 No 3 (March) pp 215–330 No 4 (April) pp 331–410 No 5 (April) pp 411–510

No 6 (May) pp 511–610 No 7 (June) pp 611–706 No 8 (July) pp 707–770 No 9 (August) pp 771–870 No 10 (September) pp 871–968 No 11 (September) pp 969–1054 No 12 (October) pp 1055–1146 No 13 (November) pp 1147–1260 No 14 (December) pp 1261–1344

## **Article Index**

#### No 1

A graph-based algorithm for extracting units and loops from architectural floor plans for a building evacuation model

G. S. Zhi, S. M. Lo and Z. Fang 1
An efficient approach for solving the straightness and the flatness problems at large number of data points J. Huang 15

Tool-path generation for *Z*-constant contour machining S. C. Park 27

A connector-based hierarchical approach to assembly sequence planning for mechanical assemblies Z. P. Yin, H. Ding, H. X. Li and Y. L. Xiong 37

Minimizing the total projection of a set of vectors, with applications to layered manufacturing

M. C. Hon, R. Janardan, J. Schwerdt and M. Smid 57

Locally optimal cutting positions for 5-axis sculptured surface machining J.-H. Yoon, H. Pottmann and Y.-S. Lee 69

A database system of mechanical components based on geometric and topological similarity. Part I: representation *M. El-Mehalawi and R. A. Miller* 83

A database system of mechanical components based on geometric and topological similarity. Part II: indexing, retrieval, matching, and similarity assessment

M. El-Mehalawi and R. A. Miller 95 Newton methods for parametric surface registration. Part I. Theory

T. M. Tucker and T. R. Kurfess 107
Newton methods for parametric surface registration. Part II. Experimental validation

T. M. Tucker and T. R. Kurfess 115 NURBS from the Pioneers

A. H. Nasri 121

Erratum to "Choosing nodes and knots in closed B--spline curve interpolation to point data" by H. Park Computer-Aided Design 33(13), 967–974 (2001) H. Park 123

#### No 2

Editorial (Part 1)

B. K. Choi 125

Boundary-conformed toolpath generation for trimmed free-form surfaces D. C. H. Yang, J.-J. Chuang and T. H. OuLee 127

Adaptive iso-planar tool path generation for machining of free-form surfaces S. Ding, M. A. Mannan, A. N. Poo, D. C. H. Yang and Z. Han 141

A corner-looping based tool path for pocket milling

H. S. Choy and K. W. Chan 155 Multiresolution analysis as an approach for tool path planning in NC machining

R. Narayanaswami and J. Pang 167

C-space based CAPP algorithm for freeform die-cavity machining B. K. Choi and K. Ko 179 Fast inverse offset computation using polygon rendering hardware M. Inui 191

An integrated CAPP/CAM system for stamping die pattern machining H. Shin, G. J. Olling, Y. C. Chung, B. H. Kim and S. K. Cho 203

#### No 3

Computing isophotos of surface of revolution and canal surface K.-J. Kim and I.-K. Lee 215

Multiresolution modeling techniques in CAD

R. Narayanaswami and J. Yan 225

From laser-scanned data to feature human model: a system based on fuzzy logic concept C. C. L. Wang, T. K. K. Chang and M. M. F. Yuen 241

A steepest descent algorithm for circularity evaluation

L.-M. Zhu, H. Ding and

Y.-L. Xiong 255

An algorithm for the interpolation of hybrid curves
H.-y. Tam, H. Xu and
P. W. Tse 267

Kinematic analysis of spatial fixed-axis higher pairs using configuration spaces

K.-J. Kim, E. Sacks and L. Joskowicz 279

Flank milling with flat end milling cutters S. Bedi, S. Mann and C. Menzel 293

Linear and angular feedrate interpolation for planar implicit curves H.-Y. Xu 301 Design of heterogeneous turbine blade X. Qian and D. Dutta 319

#### No 4

Editorial (Part 2) B. K. Choi 331

Modeling of cutting geometry and forces for 5-axis sculptured surface machining

B. K. Fussell, R. B. Jerard and J. G. Hemmett 333

Rolling ball method for 5-axis surface machining

P. Gray, S. Bedi and F. Ismail 347

Collision-free finishing toolpaths from visibility data

M. Balasubramaniam, S. E. Sarma and K. Marciniak 359

Tool path deformation in 5-axis flank milling using envelope surface C. Lartigue, E. Duc and A. Affouard 375

Off-line feed rate scheduling using virtual CNC based on an evaluation of cutting performance J. H. Ko, W. S. Yun and D.-W. Cho 383

Influence of tool path strategy on the cycle time of high-speed milling M. Monreal and C. A. Rodriguez 395

Creation of 3-D tiny statue by 5-axis control ultraprecision machining Y. Takeuchi, H. Yonekura and K. Sawada 403

#### No 5

Computing offsets of trimmed NURBS surfaces

G. V. V. R. Kumar, K. G. Shastry and B. G. Prakash 411

Optimal and collision free tool posture in five-axis machining through the tight integration of tool path generation and machine simulation

B. Lauwers, P. Dejonghe and
J. P. Kruth 421

Web-based distributed system and database modeling for concurrent design

D. Xue and Y. Xu 433

Computer-aided design method for the components made of heterogeneous materials

K.-Z. Chen and X.-A. Feng 453
Tool-path generation from measured

data
S. C. Park and Y. C. Chung 467

Extension of surface reconstruction algorithm to the global stitching and repairing of STL models
H.-T. Yau, C.-C. Kuo and
C.-H. Yeh 477

Parametric circles and spheres
A. A. Goshtasby 487

Automatic feedrate adjustment for pocket machining S.-H. Bae, K. Ko, B. H. Kim and B. K. Choi 495

Mitered offset for profile machining S. C. Park and Y. C. Chung 501

Learning CAGD is Easier and More Fun than Ever H. Qin 507

Bringing Line Geometry Together with CAGD W. L. F. Degen 509

#### No 6

Contour offset approach to spiral toolpath generation with constant scallop height

E. Lee 511

Parametric face coding for invariant model representation

L. Sun and A. Z. Qamhiyah 519
Compressed piecewise-circular
approximations of 3D curves
A. Safonova and J. Rossignac 533

Optimizing tool orientations for 5-axis machining by configuration-space search method

C.-S. Jun, K. Cha and Y.-S. Lee 549

Parameter synthesis of higher kinematic pairs M.-H. Kyung and E. Sacks 567

Virtual human modeling from photographs for garment industry C. C. L. Wang, Y. Wang, T. K. K. Chang and M. M. F. Yuen 577

A constrained guided G<sup>1</sup> continuous spline curve

D. S. Meek, B. H. Ong and D.J. Walton 591

Circle approximation using integral B-splines

L. A. Piegl and W. Tiller 601
Distributed CAD for Supporting Internet
Collaborative Design
J. Y. H. Fuh and A. Y. C. Nee 609

### No 7

Garment pattern generation from body scan data

S. M. Kim and T. J. Kang 611

Constructing medial axis transform of planar domains with curved boundaries

M. Ramanathan and B. Gurumoorthy 619

Error-based segmentation of cloud data for direct rapid prototyping G. H. Liu, Y. S. Wong, Y. F. Zhang and H. T. Loh 633 Protecting critical facets in layered manufacturing: implementation and experimental results

J. Schwerdt, M. Smid, R. Janardan and E. Johnson 647

Feature based 3D garment design through 2D sketches C. C. L. Wang, Y. Wang and M. M. F. Yuen 659

Recognising symmetry in solid models S. J. Tate and G. E. M. Jared 673

Reducing feasible contacts between polyhedral models to red-blue intersections on the sphere P. Jiménez and C. Torras 693

#### No 8

Genetic algorithms in CAD
G. Renner 707

Genetic algorithms in computer aided design

G. Renner and A. Ekárt 709
Cam shape optimisation by genetic algorithm

J. Lampinen 727

Motion fairing using genetic algorithms C.-C. Hsieh and T.-Y. Chang 739

Data fitting with a spline using a realcoded genetic algorithm F. Yoshimoto, T. Harada and Y. Yoshimoto 751

A genetic algorithm for combined topology and shape optimisations *F. Cappello and A. Mancuso* 761

### No 9

Using low-discrepancy sequences and the Crofton formula to compute surface areas of geometric models X. Li, W. Wang, R. R. Martin and A. Bowyer 771

A hybrid approach to feature segmentation of triangle meshes A. Razdan and M. S. Bae 783

Progressive sharing of modules among product variants

G. Dobrescu and Y. Reich 791
A tolerant approach to reconstruct topology from unorganized trimmed surfaces

J. C. Park and Y. C. Chung 807
Tool path regeneration for mold design

modification
L. P. Zhang, J. Y. H. Fuh and
A. Y. C. Nee 813

Algorithms for selecting cutters in multipart milling problems Z. Yao, S. K. Gupta and D. S. Nau 825

Contour-parallel offset machining without tool-retractions S. C. Park, Y. C. Chung and B. K. Choi 841 A dithering algorithm for local composition control with threedimensional printing W. Cho. E. M. Sachs. N. M. Patrikalakis and D. E. Troxel 851

#### No 10

Minimum distance between a canal surface and a simple surface K.-J. Kim 871

Dynamic highlight line generation for locally deforming NURBS surfaces J.-H. Yong, F. (Frank) Cheng, Y. Chen, P. Stewart and K. T. Miura 881

Approximate merging of B-spline curves via knot adjustment and constrained optimization C.-L. Tai, S.-M. Hu and Q.-X. Huang 893

Nonlinear kinematic tolerance analysis of planar mechanical systems M.-H. Kyung and E. Sacks 901

An algorithm for optimal free-form object matching K. H. Ko, T. Maekawa and N. M. Patrikalakis 913

Computer aided contouring operation for traveling wire electric discharge machining (EDM)

J. Wang and B. Ravani 925

Computing constant offsets of a NURBS B-Rep G. V. V. R. Kumar, K. G. Shastry and B. G. Prakash 935

Development of an Internet-enabled interactive fixture design system F. Mervyn, A. Senthil kumar, S. H. Bok and A. Y. C. Nee 945

Algebraic manipulation in the Bernstein form made simple via convolutions J. Sánchez-Reves 959

#### No 11

Fast cell-based decomposition and applications to solid modeling Y. Woo 969

An approach to identify design and manufacturing features from a data exchanged part model M. W. Fu, S. K. Ong, W. F. Lu, I. B. H. Lee and A. Y. C. Nee 979

A Z-map update method for linearly moving tools

S. R. Maeng, N. Baek, S. Y. Shin and B. K. Choi 995

Optimal connection of loops in laminated object manufacturing K. Tang and A. Pang 1011

Traversing the machining graph of a

K. Tang and A. Joneja 1023

Design of motion along parameterized curves using B-splines A. P. Pobegailo 1041

Curvature behaviours at extraordinary points of subdivision surfaces M. A Sabin, N. A. Dodgson,

M. F. Hassan and

I. P. Ivrissimtzis 1047

Computational Geometry of Freeform Curves and Surfaces G. Elber 1053

#### No 12

An algorithm for automatic 2D quadrilateral mesh generation with line constraints K.-Y. Lee, I.-I. Kim, D.-Y. Cho and

T.-w. Kim 1055

Architecture and implementation of a shop-floor programming system for STEP-compliant CNC

S. H. Suh, B. E. Lee, D. H. Chung and S. U. Cheon 1069

Selecting and parameterising components using knowledge based configuration and a heuristic that learns and forgets D. Roller and I. Kreuz 1085

Offset of curves on tessellated surfaces V. D. Holla, K. G. Shastry and

B. G. Prakash 1099 Knowledge capturing methodology in

process planning S. C. Park 1109

Feature extraction and volume decomposition for orthogonal layered manufacturing Y. Yang, H. T. Loh, J. Y. H. Fuh and

Y. S. Wong 1119

The stencil buffer sweep plane algorithm for 5-axis CNC tool path verification

E. L. J. Bohez, N. T. H. Minh, B. Kiatsrithanakorn, P. Natasukon,

H. Ruei-Yun and L. T. Son 1129 Splines with Pictures and Proofs 1143 Splines with Pictures and Proofs

J. Peters 1144 Call for papers 1145, 1146

## No 13

Generating sacrificial multi-piece molds using accessibility driven spatial partitioning J. Huang, S. K. Gupta and K. Stoppel 1147

Encapsulation of geometric functions for ship structural CAD using a STEP database as native storage J. Kim and S. Han 1161

A set of standard modeling commands for the history-based parametric approach

D. Mun, S. Han, J. Kim and Y. Oh 1171

Improvements to algorithms for computing the Minkowski sum of 3-polytopes

Y. Wu, J. J. Shah and J. K. Davidson 1181

Geometric and form feature recognition tools applied to a design for assembly methodology O. Coma, C. Mascle and

P. Véron 1193

Angular interpolation of bi-parameter curves

H. Y. Xu, Y. H. Zhou and J. J. Zhang 1211

Free-form deformation of constructive shell models

K. C. Hui 1221

Solid model reconstruction from engineering paper drawings using Genetic Algorithms K.-Z. Chen and X.-A. Feng 1235

A parametric interpolator with confined chord errors, acceleration and deceleration for NC machining

T. Yong and

R. Narayanaswami 1249

#### No 14

Lofted B-spline surface interpolation by linearly constrained energy minimization H. Park 1261

Maximal intersection of spherical polygons by an arc with applications to 4-axis machining K. Tang and Y .- J. Liu 1269

Mechanistic modelling of the milling process using an adaptive depth buffer

D. Roth, F. Ismail and S. Bedi 1287

Polynomial approximation to clothoids via s-power series

J. Sánchez-Reyes and J. M. Chacón 1305

Generating assembly features onto split solid models

C. K. Chan and S. T. Tan 1315

Isophote interpolation H. Y. Xu. H. Y. Tam and

J. J. Zhang 1337

# **Author index**

Affouard A. 375

Bae, M. S. 783 Bae, S.-H. 495 Baek, N. 995 Balasubramaniam, M. 359 Bedi, S. 293, 347, 1287 Bohez, E. L. J. 1129 Bok, S. H. 945 Bowyer, A. 771

Cappello, F. 761 Cha. K. 549 Chacón, J. M. 1305 Chan, C. K. 1315 Chan, K. W. 155 Chang, T. K. K. 241, 577 Chang, T.-Y. 739 Chen, K.-Z. 453, 1235 Chen. Y. 881 Cheng, F. (Frank) 881 Cheon, S. U. 1069 Cho, D.-Y. 1055 Cho, D.-W. 383 Cho, S. K. 203 Cho, W. 851 Choi, B. K. 125, 179, 331, 495, 841. Choy, H. S. 155 Chuang, J.-J. 127 Chung, D. H. 1069 Chung, Y. C. 203, 467, 501, 807, 841 Coma, O. 1193

Davidson, J. K. 1181 Degen, W. L. F. 509 Dejonghe, P. 421 Ding, H. 37, 255 Ding, S. 141 Dobrescu, G. 791 Dodgson, N. A. 1047 Duc, E. 375 Dutta, D. 319

Ekárt, A. 709 Elber, G. 1053 El-Mehalawi, M. 83, 95

Fang, Z. 1 Feng, X.-A. 453, 1235 Fu, M. W. 979 Fuh, J. Y. H. 813, 1119 Fussell, B. K. 333 Goshtasby, A. A. 487 Gray, P. 347 Gupta, S. K. 825, 1147 Gurumoorthy, B. 619

Han, S. 1161, 1171 Han, Z. 141 Harada, T. 751 Hassan, M. F. 1047 Hemmett, J. G. 333 Holla, V. D. 1099 Hon, M. C. 57 Hsieh, C.-C. 739 Hu, S.-M. 893 Huang, J. 15, 1147 Huang, Q.-X. 893 Hui, K. C. 1221

Inui, M. 191 Ismail, F. 347, 1287 Ivrissimtzis, I. P. 1047

Janardan, R. 57, 647 Jared, G. E. M. 673 Jerard, R. B. 333 Jiménez, P. 693 Johnson, E. 647 Joneja, A. 1023 Joskowicz, L. 279 Jun, C.-S. 549

Kang, T. J. 611 Kiatsrithanakorn, B. 1129 Kim, B. H. 203, 495 Kim, I.-I. 1055 Kim, J. 1161, 1171 Kim, K.-J. 215, 279, 871 Kim, S. M. 611 Kim, T.-w. 1055 Ko, J. H. 383 Ko. K. 179, 495 Ko, K. H. 913 Kreuz, I. 1085 Kruth, J. P. 421 Kumar, G. V. V. R. 411, 935 Kuo, C.-C. 477 Kurfess, T. R. 107, 115 Kyung, M.-H. 567, 901

Lampinen, J. 727 Lartigue, C. 375 Lauwers, B. 421 Lee, B. E. 1069 Lee, E. 511 Lee, I. B. H. 979 Lee, I.-K. 215 Lee, K.-Y. 1055 Lee, Y.-S. 69, 549 Li, H. X. 37 Li, X. 771 Liu, G. H. 633 Liu, Y.-J. 1269 Lo, S. M. 1 Loh, H. T. 633, 1119 Lu, W. F. 979

Maekawa, T. 913 Maeng, S. R. 995 Mancuso, A. 761 Mann. S. 293 Mannan, M. A. 141 Marciniak, K. 359 Martin, R. R. 771 Mascle, C. 1193 Meek. D. S. 591 Menzel, C. 293 Mervyn, F. 945 Miller, R. A. 83, 95 Minh, N. T. H. 1129 Miura, K. T. 881 Monreal, M. 395 Mun, D. 1171

Narayanaswami, R. 167, 225, 1249 Nasri, A. H. 121 Natasukon, P. 1129 Nau, D. S. 825 Nee, A. Y. C. 813, 945, 979

Oh, Y. 1171 Olling, G. J. 203 Ong, B. H. 591 Ong, S. K. 979 OuLee, T. H. 127

Pang, A. 1011
Pang, J. 167
Park, H. 123, 1261
Park, J. C. 807
Park, S. C. 27, 467, 501, 841, 1109
Patrikalakis, N. M. 851, 913
Peters, J. 1144
Piegl, L. A. 601
Pobegailo, A. P. 1041
Poo, A. N. 141

Pottmann, H. 69 Prakash, B. G. 411, 935, 1099

Qamhiyah, A. Z. 519 Qian, X. 319 Qin, H. 507

Ramanathan, M. 619 Ravani, B. 925 Razdan, A. 783 Reich, Y. 791 Renner, G. 707, 709 Rodriguez, C. A. 395 Roller, D. 1085 Rossignac, J. 533 Roth, D. 1287 Ruei-Yun, H. 1129

Sánchez-Reyes, J. 959, 1305 Sabin, M. A 1047 Sachs, E. M. 851 Sacks, E. 279, 567, 901 Safonova, A. 533 Sarma, S. E. 359 Sawada, K. 403 Schwerdt, J. 57, 647 Senthil kumar, A. 945 Shah, J. J. 1181 Shastry, K. G. 411, 935, 1099 Shin, H. 203 Smid, M. 57, 647 Son, L. T. 1129 Stewart, P. 881 Stoppel, K. 1147 Suh, S. H. 1069 Sun, L. 519

Tai, C.-L. 893
Takeuchi, Y. 403
Tam, H. Y. 1337
Tam, H.-y. 267
Tan, S. T. 1315
Tang, K. 1011, 1023, 1269
Tate, S. J. 673
Tiller, W. 601
Torras, C. 693
Troxel, D. E. 851
Tse, P. W. 267
Tucker, T. M. 107, 115

Véron, P. 1193

Walton, D. J. 591 Wang, C. C. L. 241, 577, 659 Wang, J. 925 Wang, W. 771 Wang, Y. 577, 659 Wong, Y. S. 633, 1119 Woo, Y. 969 Wu, Y. 1181 Xiong, Y. L. 37 Xiong, Y.-L. 255 Xu, H. 267 Xu, H. Y. 1211, 1337 Xu, H.-Y. 301 Xu, Y. 433 Xue, D. 433

Yan, J. 225 Yang, D. C. H. 127, 141 Yang, Y. 1119 Yao, Z. 825 Yau, H.-T. 477 Yeh, C.-H. 477 Yin, Z. P. 37 Yonekura, H. 403 Yong, J.-H. 881 Yong, T. 1249 Yoon, J.-H. 69 Yoshimoto, F. 751 Yuen, M. M. F. 241, 577, 659 Yun, W. S. 383

Zhang, J. J. 1211, 1337 Zhang, L. P. 813 Zhang, Y. F. 633 Zhi, G. S. 1 Zhou, Y. H. 1211 Zhu, L.-M. 255

# **Keyword index**

CL point utilization 813

5-Axis CNC machine 549 5-Axis control machining 403 5-Axis force estimation 333 5-Axis machining simulation 333 5-Axis milling 421 3-axis machining 1287 Adaptive depth buffer 1287 Algorithms 601 Angular feedrate 301 Anisotropic picture element 851 Approximation 533 Approximations 411, 935 Architecture 1 Assembly feature 1315 Assembly sequence planning 37 Attributed graphs 83 Automatic feedrate adjustment (AFA) 495 Axiomatic design 453

B-Rep 935
B-spline 319
B-spline curve compatibility 1261
B-spline curves 893
B-spline description format 375
B-spline surface interpolation 1261
B-splines 601, 1041
B-spline wavelets 225
Basic platform 791
Bi-parameter curves 1211
Body scans 611
Boundary-conformed 127
Boundary representation 83
Bounding box 1193

CAD 519, 709
CAD/CAM 155, 549
CAD model exchange 1171
CAM 191
Cam mechanism 727
Canal surface 215, 871
Chord error 1249
Circles 601
Circular arcs 533
Circularity evaluation 255

Clothoid 1305 Cloud data 633 CNC 301, 1069, 1337 Collision detection 871, 1129 Collision-free 359 Common edge 807 Common platform 791 Components made of heterogeneous materials 453 Compression 533 Computational geometry 255, 647. 1023, 1269 Computer aided engineering 241 Computer aided manufacturing 421 Computer aided mold design 1147 Computer automated process planning 179 Computer numerical control 267 Computer numerical control interpolators 1249 Computer-aided design 453, 659 Conceptual design 709 Concurrent design 433 Configuration space 279, 567 Configuration space search 549 Connector-based structure 37 Connector-based structure hierarchy 37 Constrained curve 591 Constrained optimization 893 Constructive shell representation 1221 Contact 693 Contour 27 Convex hull 15, 1181 Convolution 959 Correspondence search 913 Coupling of CAD and configuration 1085 Curvature 1047 Curvature estimation 783 Curve approximation 601 Cutter Selection 825 Cutting force model 495 Cutting performance 383

Cutting-load regularization 495 Cycle time 395

2D chip-load 495

2D strokes 659 2.5-D Milling 825 3D curves 533 3D design 659 3D interactive editing Data smoothing 739 Databases 1161 Deformation 881 Design for assembly 673, 1193 Design theory and methodology 453 Destructive modeling 969 Die-cavity machining 179 Die pattern 203 Digital halftoning 851 Dispersed-dot ordered dither 851 Distributed system 433 Domain partitioning 1269 Dupin indicatrix 69

Edge detection algorithm 549
Electric discharge machining 925
Engineering drawing 1235
Envelope surface 375
Evacuation 1

Fashion industry 241 Feature extraction 783 Feature identification 979 Feature recognition 203, 241, 969, 1193 Feature taxonomy 979 Feed rate planning 1249 Finite element method 1055 Fitting 533 Five-axis 347 Five-axis machining 293 Fixture design 945 Flank milling 293, 375 Flatness 15 Floor plans 1 Forgetting 1085 Free from surface machining 1269 Free form boundaries 619 Freeform deformation 1221 Fuzzy logic 241, 1193

Garment design 611 Garment industry 577, 659 Generative process planning 203 Genetic algorithm 751 Genetic algorithms 709, 727, 739, 761 Genetic Algorithms 1235 Geodesic offset 1099 Geometric algorithms 1181 Geometric Algorithms 825 Geometric and topological representation 83 Geometric design 709 Geometric modeling 751, 1161 Geometric reasoning 37, 1147 Geometric similarity 95 Geometry entity 979 Gouging 1129 Graph theory 1 Graph traversal 1023 Guided G1 spline curve 591

Haptic rendering 871
Hardware acceleration 191
Hatching 57
Hermite approximation 1305
Hermitian spline 1305
Heterogeneous object design 319
Higher pair 279, 567
Higher pairs 901
Highlight lines 881
High-speed machining 511
High-speed milling 395
History-based parametrics 1171
Hole making 1109
Hybrid curves 267

Implementation 647
Implicit curve 301
Implicit surfaces 1211
Interlocking 1315
Internet based manufacturing 945
Interpolation 267, 301, 1211, 1337
Intrinsic watermarking 913
Inverse offset 191
ISO 10303 AP238 1069
ISO 14649 1069
Isophote 141, 1337
Isophotes 215
Iso-planar 141
Iterative closest point 107, 115

Kernel modeling 1161
Kinematic analysis 279
Kinematics 901
Kinematic synthesis 567
Knot adjustment 893
Knot placement 751
Knowledge based process

Knowledge capturing 1109 Knowledge modeling 1109

Layered manufacturing 57, 647, 1011, 1119

Layered manufacturing feature extraction 1119

Layout 1

Layout design 791

Line constraint 1055

Linearly constrained energy minimization 1261

Linking 27

Local composition control 851

Local millability 69

Local modification 969

Localization 107, 115, 913

Low-discrepancy sequences 771

Low frequency textures 851

Machine acceleration and deceleration limits 1249 Machine learning in design 1085 Machine simulation 293, 421 Machined strip width 69 Machining 347, 841 Machining feature extraction 179 Machining graph 1023 Manufacturability 1119 Material design 453 Math modeling of geometric variations 1181 Maximal intersection 1269 Maximum linear intersection 1011 Measured data 467 Mechanism design 709 Mechanistic force modelling 1287 Medial axis transform 619 Merging 893 Mesh Generation 1055 Microstructure 403 Minimum distance 871 Minimum run-length 851 Minimum translational distance 255 Minimum zone 15 Minimum zone solution 255 Minkowski sum 1181 Mitered offset 501 Modeling command 1171 Modularity 791 Mold design modification 813 Motion design 1041 Motion fairing 739 Multi-pyramid segmentation 577

NC machining 167, 467
NC milling 1129
Networks of single closed
regions 1235
Numerical control 925, 1069
Numerically controlled machining 995

Multiresolution methods 225

Multivariate polynomials 959

NURBS 913 NURBS surfaces 881

Off-line feed rate scheduling 383
Offset 511, 841
Offset curves 1099
Offsetting 411, 935
Optimal tool orientation 549
Optimization 255, 611, 709, 841
Orientation 301, 693
Orientation analysis 1193
Orientation design 1041
Orthogonal deposition 1119

Pair-wise interference-detection offset 501 Parametric circle 487 Parametric interpolators 1249 Parametric sphere 487 Parametric STEP 1171 Parametric surfaces 1337, 1211 Part representation 95 Part retrieval 95 Partial matching 913 Partial surface overlap 913 Parts database 83, 95 Path planning 1011 Pattern memory 851 Photograph 577 Physics based modeling 319 Planar Meshing 1055 Pocket 841 Pocketing 167 Pocket machining 495, 1023 Pocket milling 155 Point sequence curve 1099 Polyhedra 693 Polytopes 1181 Positioning 1315 Process planning 1119 Product family 791 Profile machining 501 Projection 57

Quadrilateral 1055

Rapid product development 633
Rapid prototyping 467, 477, 633
Rational Gaussian curves and surfaces 487
Ray-tracing 1315
Registration 913
Reuse of CAD models 1085
Reverse engineering 225, 241, 467, 477, 633
Rule based process planning 1109

s-Power series 1305
Scaled Bernstein form 959
Scallop height 511, 813
Sculptured surface machining 333, 549
Segmentation 633
Shape modification 881

Shape optimisation 727, 761 Shape recognition 783 Ship hulls 1161 Shop-floor programming 1069 Silhouette curve 215 Similarity assessment 95 Simple surface 871 Simulated annealing 791 Sketched input 659 Slicing 27 Solid freeform fabrication 851 Solid model reconstruction 1235 Solid modeling 1221 Solid models 673 Spatial partitioning 1147 Spherical geometry 647 Spherical polygons 1269 Spiral toolpath 511 Spline 751 Splitting 1315 Standardization 791 STEP 83, 95, 1069, 1161 Stereo-lithography stitching 477 Stochastic methods 771 Straightness 15 Structures 1161 Subdivision 1047 Surface 347 Surface areas 771 Surface fitting 225 Surface lofting 1261

Surface of revolution 215
Surface reconstruction 477
Surface registration 107, 115
Sweep plane 1129
Swept surface 995
Swept volume 467
Symmetry 673, 1193

Tessellated curve 1099 Three-dimensional printing 851 Three-dimensional segmentation 783 Tolerance Analysis 901 Tool path 141, 395, 1337 Tool path assessment 375 Tool path generation 155, 293, 501 Tool path optimisation 421 Tool paths 267, 1211 Tool paths generation 203 Tool-path generation 813 Tool-path linking 841 Tool-path modification 813 Toolpath 127 Tool-path 467 Tool-path generation 27 Toolpaths 359 Topology optimisation 761 Topology reconstruction 807 Transformation-invariant object representation 519 Triangle mesh 783 Triangular mesh 27

Trimmed free-form surfaces 127
Trimmed NURBS surfaces 411, 935
Turbine blade 319

Ultraprecision machining center 403 Undercut 1315 Union of convex polygons 647 Unit quaternions 739

Variety 791
Vertex-based algorithm 807
View-dependent deformation 577
Virtual CNC 383
Virtual human 577
Visibility data 359
Volume decomposition 969, 1119
Voronoi diagram 619

Watershed segmentation 783 Wavelet transforms 519 Wavelets 167 Web 433 Workpiece 925

XML schema 945

Z-map 995 Z-map 27

